CHAPTER 1
Introduction

The South Florida Water Management District (SFWMD or District) develops long-term comprehensive regional water supply plans to provide for current and future water use, while protecting south Florida's water resources. Chapter 373, Florida Statutes (F.S.), requires the District to prepare water supply plans for regions where projected water demands have the potential of outstripping available supply over the next 20 years during a 1-in-10 year drought condition. The SFWMD has committed to preparing water supply plans for each of its four planning areas (**Figure 1**), which cumulatively cover the entire District. Hydrologic divides or watershed boundaries of major surface water systems generally define these regions. The regional water supply plans are updated every five years.

The Upper East Coast (UEC) Planning Area consists of Martin and St. Lucie counties and eastern Okeechobee County. The first water supply plan for the UEC Planning Area was completed in 1998 (1998 Plan) and had a planning horizon of 2020. Overall, the 1998 Plan concluded that historically used sources of water, especially the Surficial Aquifer System in the coastal portions of the region, would not be sufficient to meet projected water demands during a 1-in-10 year drought condition. However, the 1998 Plan further concluded that with appropriate management and diversification of water supply sources, there is sufficient water to meet the needs of the region. The recommendations of the 1998 Plan are being realized, including increased use of the Floridan Aquifer and reclaimed water, and increased urban and agricultural water conservation. Progress is also being made on developing much needed surface water storage to address freshwater flows to the coastal resources in the region.

This 2004 UEC Water Supply Plan Update (2004 Update) is the first update to the 1998 Plan. The 2004 Update has a planning horizon of 2025. The UEC Planning Area continues to experience rapid growth in its urban area, while agricultural acreage is projected to decrease slightly from 2000 levels. Agricultural water demand, which accounts for 73 percent of the overall water demand in the planning area, is expected to decrease by approximately 7 percent through the planning horizon. At the same time, the region's population is projected to increase by 52 percent, from 320,000 to over 486,000. Overall water demand is projected to increase by 15 percent to 337 million gallons per day. These demands need to be met, while meeting the needs of the environment. Minimum flows and levels (MFLs) have been established for the St. Lucie River Estuary and the Northwest Fork of the Loxahatchee River and a restoration plan is being developed for the Loxahatchee River.

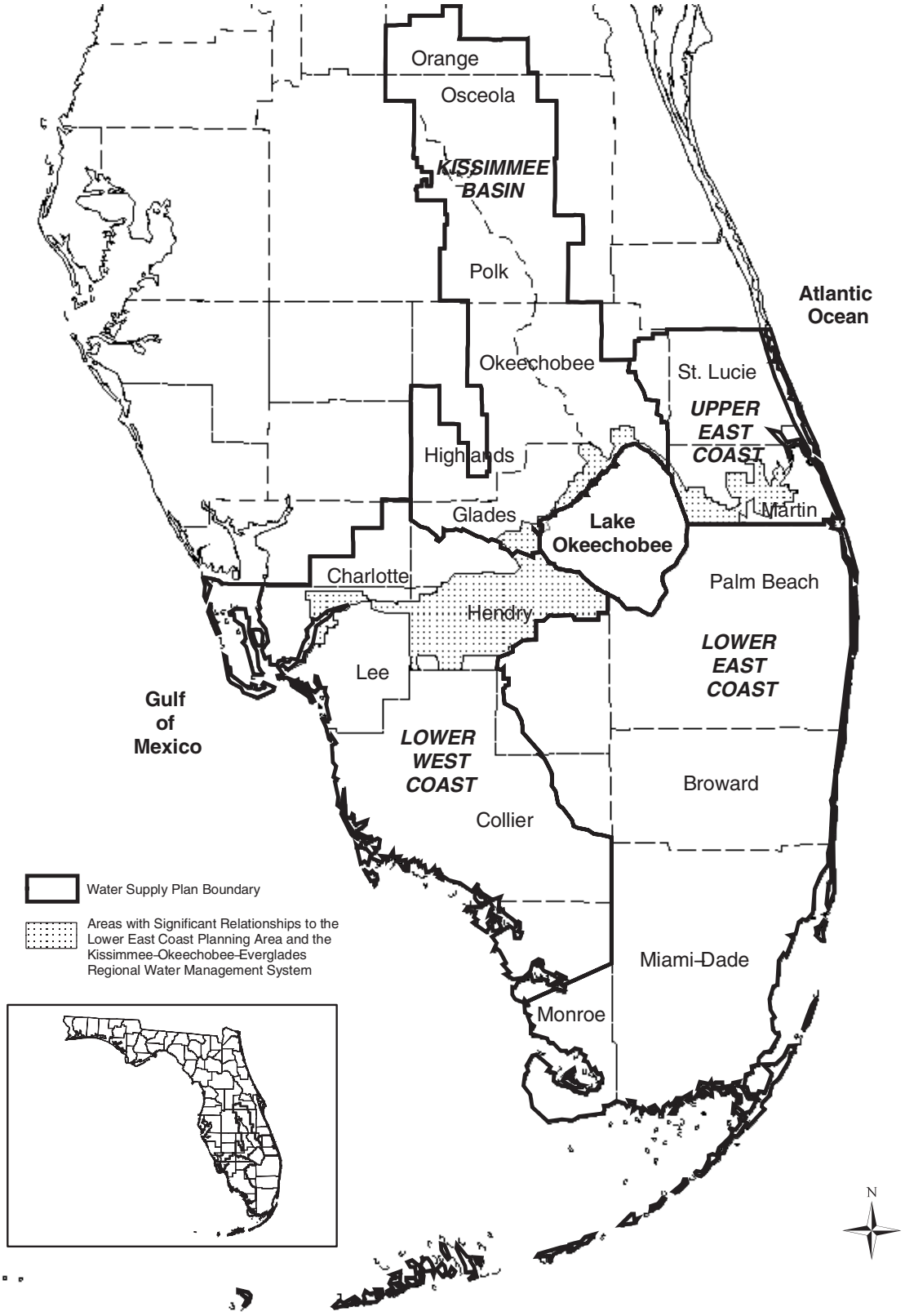

Figure 1. Planning Areas of the South Florida Water Management District.

Establishment of an initial water reservation for the Northwest Fork of Loxahatchee River has been initiated; and, the Indian River Lagoon – South Project Implementation Report presently indicates the District will adopt initial reservations of existing water for the protection of fish and wildlife for the St. Lucie River and southern Indian River Lagoon. Additionally, the District will reserve water made available by the CERP Indian River Lagoon – South Project for protection of fish and wildlife. This update will address urban, agricultural and environmental needs.

PURPOSE

The purpose of water supply planning is to develop strategies to meet future water demands of urban and agricultural uses, while meeting the needs of the environment. This process identifies areas where historically used sources of water will not be adequate to meet future demands, and evaluates several water source options to meet the deficit.

Legal Authority and Requirements

Water supply planning activities were first required of the state's water management districts following adoption of the *Florida Water Resources Act of 1972* (Chapter 373, Florida Statutes). The authors of "*A Model Water Code*" (Maloney *et al*., 1972), upon which much of Chapter 373 is based, theorized that proper water resource allocation could best be accomplished within a statewide, coordinated planning framework. The *State Water Use Plan* and the *State Water Policy* were the primary documents formulated to meet this objective.

With the passage of subsequent legislative amendments, the Legislature eliminated the State Water Use Plan and called for the development of the Florida Water Plan. The Florida Water Plan is required to include the Water Resource Implementation Rule (formerly known as the State Water Policy) and District Water Management Plans (DWMPs).

The Water Resource Implementation Rule (Chapter 62-40, F.A.C.) sets forth goals, objectives and guidance for the development and review of water resource programs, rules and plans. These directives are prescribed in the Water Resources Act (Chapter 373, F.S.), the *Florida Air and Water Pollution Control Act* (Chapter 403, F.S.) and the *State Comprehensive Plan* (Chapter 187, F.S.). These statutes provide the basic authorities, directives and policies for statewide water management, pollution control and environmental protection. The current legal framework for water supply planning is shown in **Figure 2**. The history of water supply planning is included in the *DRAFT Consolidated Water Supply Plan Support Document.*

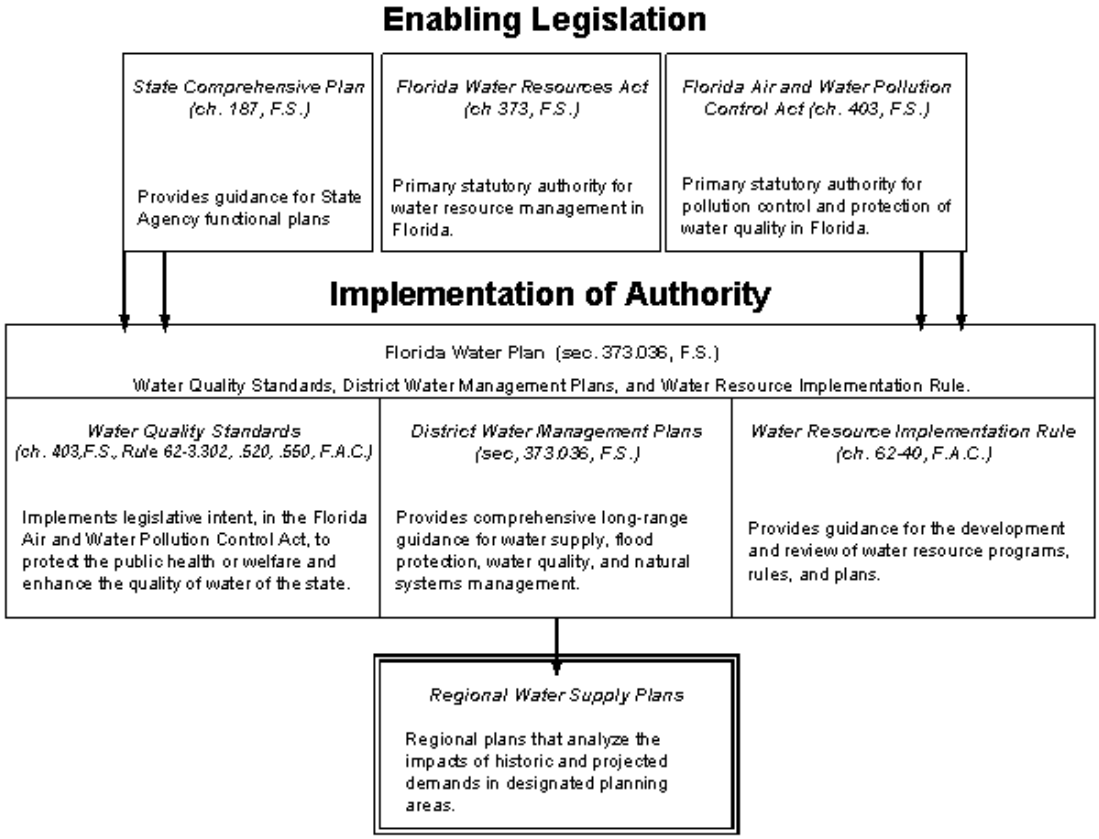

Figure 2. Legal Framework for Water Supply Planning.

The 1997 Legislature adopted more specific legislation concerning the role of the water management districts in water resource and water supply planning and development. The legislative intent was to provide for current and future human and environmental demands for a 20-year planning horizon.

Regional Water Supply Plans

Regional water supply plans provide more detailed, region-specific information than the water supply assessments. Analyses are conducted within each regional water supply plan that evaluates the impacts of projected demands on available water resources and water resource related natural systems. If projected impacts are more severe than a pre-defined threshold, recommendations are made to increase the availability of additional water resources until the impacts are reduced below the threshold.

Each regional water supply plan is based on at least a 20-year future planning horizon and includes, but is not limited to the following components as stated in Subsection 373.0361(1), F.S.:

- A water supply development component.
- A water resource development component.
- A recovery and prevention strategy for addressing attainment and maintenance of MFLs in priority water bodies.
- A funding strategy for water resource development projects that shall be reasonable and sufficient to pay the cost of constructing or implementing all of the listed projects.
- Consideration of how the options addressed serve the public interest or save costs overall by preventing the loss of natural resources or avoiding greater future public expenditures for water resource development or water supply development (unless adopted by rule, these considerations do not constitute final agency action).
- The technical data and information applicable to the planning area that are contained in the DWMP (SFWMD, 2000a) and necessary to support the regional water supply plans.
- The MFLs established for water resources within the planning area.

PLAN GOALS AND OBJECTIVES

The following goal and objectives for this 2004 Update are presented to guide development of the water supply plan to ensure the water needs of this region will be met through 2025. The goal and objectives of the 1998 Plan were used as a starting point. They were reviewed and modified as appropriate.

Overall Water Supply Planning Goal

The overall goal in water supply plans is derived from the *State Comprehensive Plan*:

> Florida shall assure the availability of an adequate supply of water for all competing uses deemed reasonable and beneficial and shall maintain the functions of natural systems and the overall present level of surface and groundwater quality. Florida shall improve and restore the quality of waters not presently meeting water quality standards.

Plan Goal

The water resource goal of the state was incorporated into the goal for this Plan:

> Identify sufficient sources of water and funding to meet the needs of all reasonable-beneficial uses within the Upper East Coast Planning Area for the year 2025 during a drought event that has the probability of occurring no more frequently than once every 10 years, while sustaining the water resources and related natural systems.

Plan Objectives

The following regional objectives (no implied priority) were developed to ensure the Upper East Coast Water Supply Plan addresses the specific needs of the planning area:

Water Supply: Identify sufficient sources of water to meet projected 2025 water demands during a 1-in-10 year drought event, without causing harm to natural resources.

Conservation and Alternative Source Development: Increase levels of conservation to increase the efficiency of water use; and, increase the use of alternatives sources to reduce dependency on drought susceptible water sources.

Floridan Aquifer: Encourage development of the Floridan Aquifer as an option to sources that depend on local rainfall for recharge. Establish a monitoring program to collect data to better understand the relationship between water use, water levels and water quality.

Estuarine and Riverine Systems: Protect and enhance the Loxahatchee River, the St. Lucie River and Estuary and the Indian River Lagoon through effective water deliveries and management of the water resources.

Water Resource Protection: Protect wetland systems and the water resources from harm due to water use, including drawdowns and harmful movement of saline water.

Compatibility with Local Governments: Coordinate the UEC Water Supply Plan with the water supply related elements of local government.

Other Regional Planning Efforts: Achieve compatibility with other related regional water resource planning efforts. These include the Indian River Lagoon (IRL) Surface Water Improvement and Management (SWIM) Plan, Comprehensive Everglades Restoration Plan (CERP), CERP IRL – South Project, CERP North Palm Beach County Project Part 1, Lake Okeechobee SWIM Plan, Lower East Coast and Kissimmee Basin Water Supply Plans, IRL National Estuary Program Comprehensive Conservation and Management Plan, St. Johns River Water Management District (SJRWMD) Districtwide Water Supply Assessment and Northern Palm Beach County Comprehensive Water Management Plan.

PLANNING PROCESS

The planning process for development of the 2004 Update included comprehensive public participation, coordination with local governments and other agencies, review of previous planning efforts in the region, documentation of activities that have taken place since approval of the 1998 Plan, development of 2025 demand projections, comparison of the 2025 scenario for the 2004 Update with the 2020 scenario simulated in the 1998 Plan and development of an analysis approach for the 2004 Update. Public participation was ongoing throughout the planning process. The goals and objectives of this Plan were developed by staff and the public, and provide the overall framework for the planning process.

Public Participation

Public participation in development of the 2004 Update was provided through the District's Water Resources Advisory Commission (WRAC). The SFWMD Governing Board established the WRAC in March 2001 as an advisory body to the Governing Board to provide a forum for improving public participation and decision-making on water resource issues affecting south Florida. The WRAC includes members from various interests (e.g., environmental, urban and agricultural) throughout the District. The WRAC meetings were open to the public.

The SFWMD held seven UEC Water Supply Plan WRAC Regional Workshops in the planning area from May 2003 through June 2004 to receive public input in development of this Plan. The workshops were well attended by stakeholders representing a cross-section of user groups in the region including utilities, local government planning departments, various local, state and federal agencies, elected officials, agriculture and the environment. In addition, demand projections were provided to industry experts for review and comment, and some industry experts made presentations during the workshops. Meetings were also held with local government planning departments and utilities to discuss these projections and coordinate land and water planning processes. Presentations were also made to local government elected bodies on the Plan and its conclusions.

Coordination with Adjacent Districts

The UEC Planning Area's northern boundary is the St. Lucie – Indian River County line, which is also the boundary between the SFWMD and the SJRWMD. Coordination with the SJRWMD was ongoing through out the water supply planning process. Representatives of the SJRWMD attended a majority of the regional water supply workshops. Coordination also occurred through Water Planning Coordination Group meetings, where staff from neighboring water management districts and the Florida Department of Environmental Protection (FDEP) discussed methodologies for

demand projections, outlines and schedules for regional water supply plans, conservation and reuse. The objective of these meetings was to achieve consistency in water supply planning among the water management districts.

Relationship to Districtwide Water Supply Assessment

In 1997, water supply planning requirements were incorporated into Chapter 373, F.S. The statutory changes required each water management district to prepare a Districtwide Water Supply Assessment (DWSA) that identify areas that have the potential for demands to exceed available supplies (without causing unacceptable environmental impacts) over a 20-year future time horizon. For each of these areas, the SFWMD is required to prepare regional water supply plans. The SFWMD's *1998 Districtwide Water Supply Assessment* (SFWMD, 1998a) confirmed the District's decision to prepare water supply plans that cumulatively cover the entire SFWMD.

The DWSA demand projections were updated in 2003 and provided the updated water demand assessments for 2000 and projections through 2025 for all categories of water use for this Plan Update. An update to the DWSA was not published. The updated projections are presented in the regional water supply plan for each region. The SFWMD develops regional water supply plans for the four regions within the District.

UEC Boundary Changes

The District made minimum changes to the UEC Planning Area boundary in the 1998 DWSA and the boundary used in the 1998 Plan. Boundary changes were made to more accurately reflect the way analyses were made (by county). This involved transferring small areas of Martin and St. Lucie counties from the Kissimmee Basin to the UEC Planning Area. This reduced the number of counties split between the two planning regions from three to one. As a result, all of Martin and St. Lucie counties are located within the UEC Planning Area.

PLANNING AREA DESCRIPTION

The Upper East Coast is one of four regional planning areas in the SFWMD. The planning area covers 1,230 square miles and includes all of Martin and St. Lucie counties, and a small portion of Okeechobee County (**Figure 3**). The planning area generally reflects the watersheds of the C-23, C-24, C-25 and C-44 canals. This Plan also considers the water needs of the Loxahatchee River and the associated watershed, which lies partially within Martin County. There is a transition in land use within the region from urban in the east to agricultural in the west. The predominant land use has been and is predicted to be agriculture. Citrus is by far the dominant crop in the planning area and occupies over four-fifths of the irrigated agricultural acreage in the region. Interspersed with these land uses are about 200,000 acres of upland forests and wetlands.

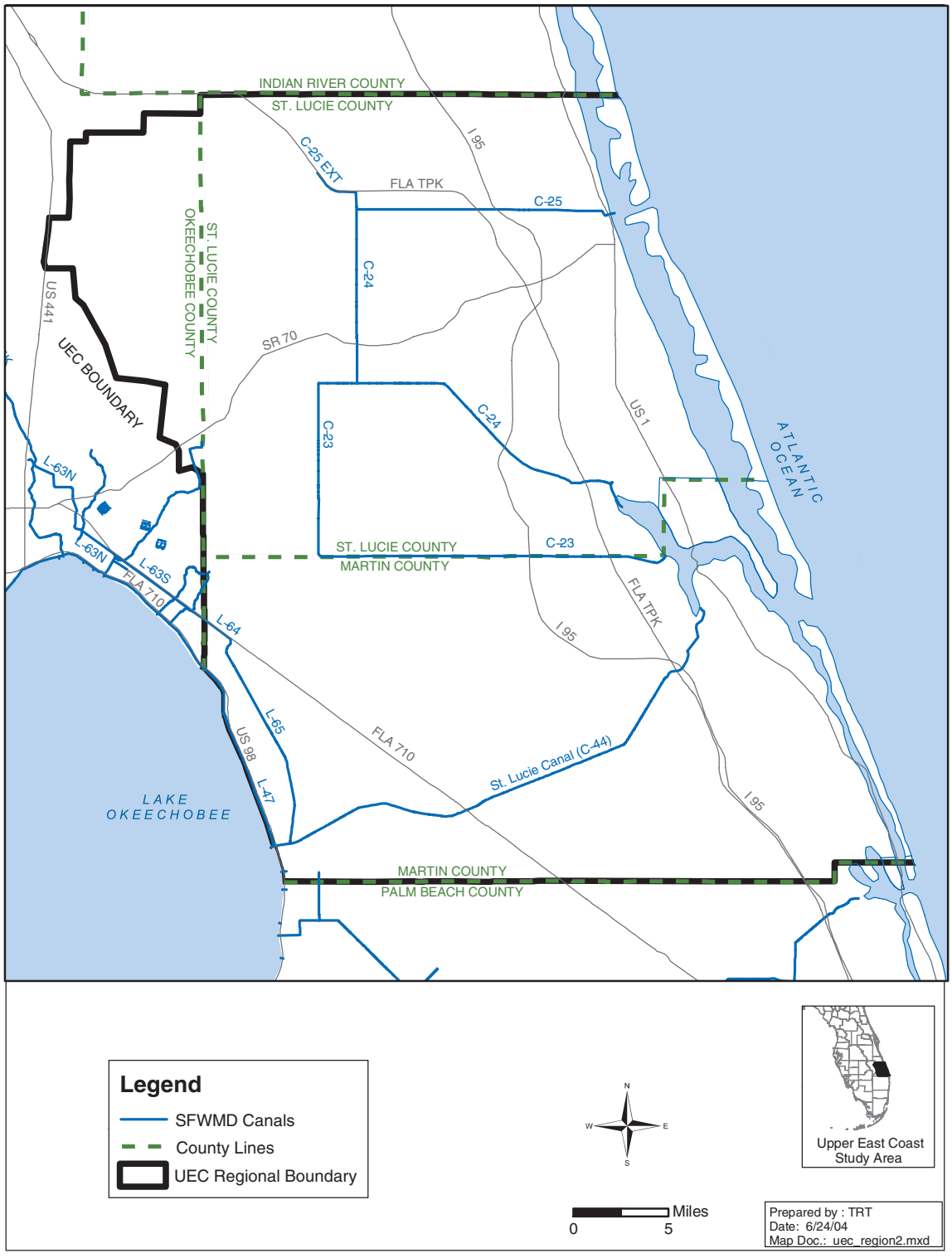

Figure 3. Upper East Coast Planning Area.

The 2000 Census (U.S. Bureau of the Census, 2001) showed St. Lucie County to have 192,695 residents and Martin County to have a population of 126,731. The Okeechobee Area (the portion of the county within the UEC) was assessed as 1,238. Port St. Lucie was the most populous city in the UEC Planning Area, with 90,500 residents in 2000. In 2000, there was approximately 186,000 acres of irrigated agriculture in the planning area.

Water for urban and agricultural uses in the UEC Planning Area comes from three main sources: the Floridan Aquifer System (FAS), the Surficial Aquifer System (SAS) and surface water. Surface water from the C-23, C-24, C-25 and C-44 canals is used primarily for agricultural irrigation, with the FAS used as a backup source during periods of low rainfall. The SAS has been the principal source for public water supply and urban irrigation. Withdrawals from the SAS have been maximized along the coast and alternative water supplies are being developed to meet the growing water needs. These include the FAS as a source of drinking water and reclaimed water for irrigation water.

The SAS and surface water are dependent upon rainfall for recharge. The average annual rainfall in the UEC Planning Area is about 55 inches. Over 70 percent of this occurs during the wet season months, from June through October. In addition to seasonal variation, rainfall varies significantly from year to year with historic annual amounts ranging from 30 inches to over 90 inches in the planning area. Rainfall also varies areally, with rainfall amounts generally decreasing from east to west.

There are four primary drainage canals in the UEC Planning Area that are part of the Central and Southern Florida Flood Control Project. These canals (C-23, C-24, C-25 and C-44) have also become important sources of irrigation water within their respective drainage basins.

The C-44 Canal was constructed as a navigable flood control outlet for Lake Okeechobee. The C-44 is the only one of the four canals that receives inflow from outside its drainage basin. The C-23, C-24 and C-25 canals, by contrast, are solely dependent on rainfall as a source of inflow. As a result of the large demand for this limited surface water supply, there are prohibitions for any new or expanded water supply uses of these three canals.

Major natural systems within the UEC Planning Area consist of inland and coastal resources and include Lake Okeechobee, Indian River Lagoon, St. Lucie River and Estuary, portions of the Loxahatchee River, the Savannas, Pal-Mar, Jonathan Dickinson State Park and DuPuis Reserve.

Dupuis Reserve

ACCOMPLISHMENTS

The 1998 Plan recommendations were organized under five water source options. The water source options and recommendations were developed to resolve water supply issues, which were identified in the analyses conducted in the planning process. These issues included surface water availability, Floridan Aquifer water quality, limits on Surficial Aquifer expansion, discharges to the St. Lucie Estuary and Indian River Lagoon and saltwater intrusion vulnerability.

In moving from issue identification to solution development, several water source options were considered to address the water supply issues identified. Eight water source options were initially identified to consider in the UEC Planning Area. These options make additional water available, either from the same source or other sources (e.g., the Floridan Aquifer) or they reduce demand (e.g., conservation). The eight options are (in no implied priority):

- Surface water storage.
- Aquifer storage and recovery (ASR).
- Floridan Aquifer.
- Surficial Aquifer System wellfield expansion.
- Conservation.
- Wastewater reuse.
- Utility interconnects.
- Ocean water.

Development of each of these options had regional, as well as local responsibilities. The water source options and the responsibilities at the regional and local levels were discussed in Chapter 5 of the 1998 Plan.

The 1998 Plan contained 30 recommendations. These recommendations and associated implementation status are presented in **Table 1**. They are organized by the water source option listed in the aforementioned bullet list. Each recommendation was numbered according to its associated water source option. There were no recommendations developed for SAS wellfield expansion or ocean water.

Table 1. Implementation of 1998 Plan Recommendations.

Recommendation	Progress
Surface Water Storage 1.1 Complete the Indian River Lagoon Restoration Feasibility Study – The primary focus of the Feasibility Study is environmental restoration of the St. Lucie Estuary (SLE) and Indian River Lagoon (IRL).	The final Project Implementation Report (PIR) Public Notice was signed by the U.S. Army Corps of Engineers (USACE) in Atlanta in March 2004. The Plan will be submitted to the USACE Headquarters in Washington, D.C. for final review. The goal is to seek project authorization and funding in the *Water Resources Development Act of 2004 (*WRDA 2004).
1.2 Identify, design and construct other regional attenuation facilities.	The need for additional regional attenuation facilities has not been identified outside of the CERP. Additional storage needs could be identified through adaptive management processes including Restoration Coordination and Verification (RECOVER).
1.3 Support design and construction of the Ten Mile Creek Critical Restoration Project.	Construction of the Ten Mile Creek Critical Restoration Project began in November 2003 and will be completed in 2005.
1.4 Develop and adopt a minimum flow and level for the St. Lucie Estuary.	The MFL for the St. Lucie River and Estuary was established in 2002.
1.5 The District will evaluate increasing conveyance in the C-canals [C-23].	Three of four phases of deposition removal in the C-23 Canal have completed covering over 21 miles. The last section is being survey to determine the amount of deposition to determine if removal is necessary.
Aquifer Storage and Recovery 2.1 Colocation of ASR and Surface Water. 2.2 Water Quality Data for Surface Water ASR. 2.3 Reactivate Demo Project for Lake Okeechobee. 2.4 Rulemaking for Untreated Water ASR. 2.5 Rulemaking for Conflicts of ASR and the Floridan Aquifer. 2.6 Inject Surface Water into Floridan Aquifer. 2.7 Inject Surface Water Along Coast.	Four of these recommendations were addressed in development of the CERP IRL – South Feasibility Study. Aquifer storage and recovery was not identified as a component in the recommended plan. Rules related to ASR were incorporated into the Water Use Basis of Review in 2003. In addition, the District initiated a major study in 2001 to evaluate the fate of microorganisms in the aquifers related to ASR.
Floridan Aquifer System 3.1 The District will remove the Floridan Aquifer from MFL priority list.	The Floridan Aquifer was removed from the MFL priority list in 1997.
3.2 The District will develop and implement a comprehensive regional aquifer monitoring network to collect the necessary information to develop relationships between water use, water quality and water levels.	A comprehensive Floridan Aquifer monitoring well network was established in 2000 in the UEC Planning Area. It built upon two existing networks operated by the SFWMD and the U.S. Department of Agriculture – Natural Resources Conservation Service (USDA–NRCS). The network is described in the appendices of this Plan.

Table 1. Implementation of 1998 Plan Recommendations (Continued).

3.3 The District will develop options for a volunteer or incentive-based Floridan well abandonment program.	Since 1998, over 40 Floridan wells have been decommissioned with funds from a District cost-share program with the USDA–NRCS.
3.4 The District will work with the FDEP and EPA to explore alternative desalination disposal options.	The District participated in a workshop in 1999 with the St. Johns River Water Management District, FDEP and EPA concerning options for disposal of concentrate from desalination treatment facilities. There has been no significant progress made on reclassifying concentrate.
3.5 The District will evaluate Floridan Aquifer recharge areas (in central Florida and outside the planning area) and identify activities, if any that could have a resulting negative effect on the Floridan Aquifer in the UEC Planning Area.	Activities in the Floridan Aquifer recharge areas in central Florida have been studied in the Kissimmee Basin Water Supply Plan. The SFWMD analyses show that activities in central Florida would have minimal impacts, if any, on the Floridan Aquifer in the UEC Planning Area.
Conservation 4.1 The District will promote water conservation for all users of water through, but not limited to, fiscal incentives, such as the Alternative Water Supply Funding Program.	The District provides funding assistance to water users for development of alternative water supplies and water conservation through two cost-share programs: Alternative Water Supply Funding Program. The District has provided about $3.1 million for 19 alternative water supply projects in the UEC Planning Area between 1998 and 2004. These projects produce over 32 million gallons per day (MGD) of additional water supply. Water Savings Incentive Program (WaterSIP). Water SIP was established by the District in 2002 to provide cost-share funding for the implementation of water saving projects that reduce urban water usage. In two years, this program has provided $700,000 for 19 projects Districtwide. No projects in the UEC Planning Area have been submitted for consideration of funding. Citrus Irrigation Conversion Program (District cost-share program with USDA–NRCS): From 1998 through 2002, 2,200 acres of citrus were converted from flood irrigation to microirrigation under this program. This saved 1.34 billion gallons in the Upper East Coast over that five-year period.[a]

a. D. Smith. 2003. U.S. Department of Agriculture, Natural Resources Conservation Service (USDA–NRCS), Fort Pierce, FL.
b. M. Rosen. 2003, Mobile Irrigation Lab Program Manager, South Florida Water Management District, West Palm Beach, FL.

Table 1. Implementation of 1998 Plan Recommendations (Continued).

4.2 Provide cost-share funding for mobile irrigation laboratories.	Two urban mobile irrigation labs (MILs) and one agricultural MIL are operating in the UEC Planning Area. The urban labs are funded by the District and perform urban evaluations in Martin and St. Lucie counties. The USDA–NRCS continues to operate the agricultural lab in Martin, Okeechobee and St. Lucie counties. The efforts of the urban and agricultural MILs are estimated to have resulted in an 8.3-MGD savings from 1998–2002.[b]
Wastewater Reuse 5.1 The District will develop regulatory and fiscal incentives, such as the Alternative Water Supply Funding Program, for reuse in the UEC Planning Area.	Regulatory incentives, including 20-year permits, were addressed in the water use rule revisions in 2003. The Alternative Water Supply Funding Program has funded eight water reuse projects in the UEC Planning Area from 1998–2004. These projects produce almost 7 MGD of additional water supply.
5.2 The District will encourage utilities to evaluate reclaimed water system interconnects to increase reuse in potential problem areas.	The District has continued to encourage reclaimed water interconnects. Martin County Utilities (MCU) is constructing a consolidated reuse system that will result in an interconnected and regionalized reclaimed water distribution system.
5.3 The District will adopt rules implementing the requirements of Section 373.250, F.S. related to wastewater reuse and back-up sources.	Water use rule revisions were completed in 2003.
5.4 The District will provide assistance for reclaimed water projects that involve groundwater recharge and indirect potable reuse, and will assume the lead role for such projects that are of regional significance.	Staff has worked with utilities to identify opportunities for groundwater recharge and indirect potable reuse. However, there has been no interest by the utilities. The utilities in this region are pursuing irrigation based reuse systems.
5.5 The District will discuss with the FDEP, and participate in rulemaking, standards for reclaimed water quality for groundwater recharge, indirect potable reuse projects and wet weather disposal.	The District continues to participate on the Statewide Reuse Coordinating Committee to discuss statewide reuse issues.
Utility Interconnects 6.1 The District will encourage potable water interconnections between utilities for emergency purposes and evaluation of interconnections for water supply purposes.	The District has continued to encourage water interconnects. Martin County Utilities (MCU) is developing a consolidated system, interconnecting their four water distribution systems.

a. D. Smith. 2003. U.S. Department of Agriculture, Natural Resources Conservation Service (USDA–NRCS), Fort Pierce, FL.
b. M. Rosen. 2003, Mobile Irrigation Lab Program Manager, South Florida Water Management District, West Palm Beach, FL.

Table 1. Implementation of 1998 Plan Recommendations (Continued).

Related Implementation Strategies	
7.1 The District will incorporate the assumptions and criteria used in development and findings of the UEC Water Supply Plan into the District's Consumptive Use Permitting Program, including any rulemaking, including: a uniform level of drought; the resource protection criteria used in the 1998 Plan; a cumulative analysis to deal with local conditions and new technologies; and development and adoption of appropriate water shortage triggers for resource protection.	Water use rule revisions were completed in 2003 that addressed this recommendation.
7.2 The District will continue coordination of the UEC Water Supply Plan with local governments/utilities, the SJRWMD and the CERP.	The 1998 UEC Water Supply Plan continues to be coordinated with related planning efforts, local governments/utilities and the SJRWMD.
7.3 Continue the ongoing SFWMD wetland drawdown study.	The District completed its wetland drawdown study that implemented hydrobiological monitoring at various wetland sites throughout the District to determine the effects of groundwater drawdowns on these systems. Several sites in the UEC Planning Area were included in the Study. The results of the Study were used to support water use rule revisions in 2003.
7.4 Wetland mitigation associated with projects in the UEC Planning Area should remain in the region. Additionally, it is recommended that a mitigation bank be established in the UEC Planning Area.	There have been four mitigation banks in the UEC Planning Area permitted since 1998. Three are in St. Lucie County (Treasure Coast, Platt's Creek and Bluefield Ranch), while the other one is in Martin County (RG Reserve).
7.5 The District should fund implementation of the UEC Water Supply Plan.	As shown here, the 1998 UEC Water Supply Plan has been successfully implemented.